# DETERMINANTS OF ENERGY SAVINGS PROGRAM IN AN ORGANIZATION

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**Research Report in partial fulfillment of the requirements of the degree of MBA**

**2012**

**MASTER OF BUSINESS ADMINISTRATION (ONLINE)**

**UNIVERSITI SAINS MALAYSIA**

**Acknowledgement**

I would like to express my gratitude to my supervisor, Assoc. Prof. Dr. Suhaiza Hanim Mohamad Zailani, who provided me guidance, support, advise throughout the preparation of this research paper. I greatly appreciate her time, efforts, comments, and sharp insights that have really helped me to improve this thesis. I also would like to take this opportunity to thank my sister, Tze Ling, who helped me and support me in the completion of this thesis. Special thanks to my friends and fellow colleagues, who helped me in companies' data collection. Lastly, I would like to dedicate this study to my husband and my baby, thanks for their support, sacrifices, and encouragement that keep me motivated and determined towards meeting the goal.

Thank you.

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**Pendorongan Penjimatan Tenaga di  Sesebuah Syarikat**

## Abstrak

Perubahan cuaca dan isu-isu persekitaran diberi perhatian secara berterusan oleh kerajaan, masyarakat dan organisasi perniagaan. Penjimatan Tenaga muncul sebagai satu pendekatan baru yang meluaskan tanggungjawab persekitaran di samping mengekalkan prestasi ekonomi and kebaikan sosial. Kajian ini menyelidik kewujudan Inisiatif Penjimatan Tenaga di negeri Pulau Pinang, yang melibatkan syarikat yang terletak dalam Zon Industri di Bayan Lepas dan Prai, antisiden-antisiden yang menggalakan syarikat supaya mengamalkan inisiatif tersebut dan kesan daripada amalan Penjimatan Tenaga. Demi mencapai tujuan ini, kajian ini menggunakan pendekatan kuantitatif dengan mengedarkan soalan kajian kepada syarikat terletak di Zon Perindustrian Bayan Lepas dan Prai. Sejumlah 113 maklumbalas boleh guna telah diterima. Kajian ini mendedahkan focus inisiatif Penjimatan Tenaga, lima kumpulan antisiden-antisiden ( kewangan, persekitaran, undang-undang, sosial, organisasi), dan kesimpulan daripadanya, iaitu kebaikan Penjimatan Tenaga. Keputusan daripada kajian menunjukkan Sosial and Organisasi faktor memainkan kesan positif dalam penerimaan inisiatif.  Tambahan pula, kajian ini menunjukkan bahawa inisiatif-inisiatif ini sokong korelasi terhadap kesan Penjimatan Tenaga.

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## Abstract

Climate change and environmental issues constitute concern for governments, societies as well as the business organizations. Energy Savings emerged that extends environmentally responsibility of organization throughout maintaining their economic performance and social benefits. This study investigates the existence of Energy Savings Initiatives in Penang State, including the Bayan Lepas and Prai Industrial area, the antecedents that motivate firms to adopt these initiatives, and the outcome of the adoption. To attain its objectives, this study utilized quantitative approach by distributing survey questionnaire to the manufacturing companies within Bayan Lepas and Prai Industrial area in Penang state. A total of 113 usable responses were received. This study revealed a focus of Energy Savings Initiatives, five categories of antecedents (Financial, Environment, Legal, Social, and Organization), and outcome, the benefits of Energy Savings. The results of the survey indicate that the Social and Organizational factors have positive effect on the initiative adoption. And the study also shows that there are correlation of Energy Savings Initiatives with the Outcomes.

# CHAPTER 1

# INTRODUCTION

## 1.0 Introduction

This study discusses the overall approach of this study, reasons and factors that drive the topic of this study. This study will examine why and what are the energy savings initiatives the organizations adopt towards energy saving programs in their internal operations and supply chains. This study briefly discuss on multiple incentives exist for companies to adopt energy savings operational and capital improvements. This study also discuss most of the companies adopt energy saving programs because of the cost-savings and marketing value created by reducing the environmental impact of production. The financial, environment, legal, social and organizational factors of companies to engage energy savings programs are subject to the energy intensity of production, the product market, and the company's position in the supply chain. The purpose of this study is to determine the factors that influence the energy savings program of an organization.

## 1.1 Background of Study

Companies make a series of decisions about how set goals, identify, finance, implement and report energy saving programs in their internal operations and supply chains. Energy savings is ranked as a high priority on the environmental agenda throughout the world (Junnila, 2007). Implementing energy saving programs in a company is affected by multiple sources of information and learning. The sources for information and learning

can be both internal and external to the company. The capability of in-house engineering teams is vital to successfully implementing energy saving programs. The trust between plant managers primarily interested in continual production, business operation units interested in revenue growth, and engineering team supporting these internal actors is crucial to successfully adopting energy saving programs. Capital budgeting methods typically used by companies, especially by engineers, do not suitably account for the full value of capital improvements in energy savings. Net present value and other innovative methods allow companies to meeting their goals in reducing carbon emissions in their capital budgeting decision (Brun & Gereffi, 2011).

External actors possesses information and expertise about how to increase the energy efficiency of a firm's manufacturing process, for instance, governments, utilities, and other organizations can assist companies in identifying and implementing energy savings opportunities (Brun & Gereffi, 2011). Improving energy efficiency is one of the most constructive, cost-effective ways to address the challenges of high energy prices, air pollution and global climate change. Energy saving programs still remain underutilized in the nation's energy portfolio despite these benefits and the success of energy saving programs. Evaluating the cost-effectiveness of energy saving programs is essential in identifying how much of a company's potential for energy efficiency resources will be captured. Energy efficiency cost-effectiveness is measured by comparing the benefits of an investment with the costs (A Resource of the national action plan for Energy Efficiency, 2008).

Energy as is known today as an important factor of modern development. There is none any aspect of the modern life that does not have the imprint of energy input –

entertainment, recreation, agriculture, commerce, industry, transport, education, communication, health, architecture and more. Massive increase in productivity and change in lifestyle began with the unprecedented use of energy during the industrial revolution. The most widely used energy sources are the hydrocarbon compounds or fossil fuels which account for more than 80% of global primary energy consumption (Awwad et al, 2007). Fossil energies provide about 67% of the energy needed to produce electricity. There is a concern in the continued use of fossil fuels in addition to its finite future and the lack of possible replacement is in the area of environment. It has been observed that among the various sectors contributing to green house gases (GHG) emissions, industrial sector contribution was significant to the environment (David Yih-Liang et al, 2007). Thus, energy efficiency is a major key in this regard mitigating GHG emissions from the sector confronting the climate change problem.

Climate change is widely acknowledged as the biggest environmental challenge facing the world today. Average global temperatures are raising and we are seeing more extreme weather events such as heat waves, storms, droughts and flooding - the recent flash floods happened in Bangkok, Thailand. These changes are believed to be as a result of rising levels of Carbon Dioxide ($CO_2$) and other greenhouse gases in our atmosphere, which in turn are caused by the burning of fossil fuels for energy and transport (Unachukwu, Zarma & Sambo, 2007). We can combat climate change by using our energy efficiently and long term purchasing clean renewable energy where possible, for example energy that is generated using natural resources such as wind, wave, and sun.

There are studies from Prindle (2010) show that driven by the rising of energy prices and the concerns about greenhouse gas emissions, there are more companies implementing

aggressive energy savings program and the results are impressive. Over the studies done by Prindle (2010), there are businesses leading the way in showing that the climate challenge can be met in a way that allows for continued economic growth. He added that the companies that have achieved these successes share several key attributes which include commitment from the top management to energy savings program (Organization) (Prindle, 2010).

## 1.2 Problem Statement

Many industrial companies use a much higher volume of energy for production, hence, combined with increased rates of electricity, gas and other resources, are generating much more interest in energy savings (Rao, 2004). However, many companies are underestimating the opportunities and benefits of increased energy efficiency. Company managers tend to underestimate the importance of a systematic approach to energy efficiency that by having a thorough and comprehensive energy efficiency program can help a company realize a greater number of projects and enjoy more success by using most effective and cost-efficient routes (Hart, 1997). Many companies do not fully utilize efficient organizational such as motivating managers via results-based bonuses to put energy efficiency programs into place (Govindarajulu, Daily, 2004). The organization can achieve optimal results in energy efficiency if they take into account the following success factors.

Create energy efficient behavior or awareness by identifying common perceptions of behavior change strategies and by identifying contexts in which the people of the organizations are more likely to be motivated to pursue behavior change as means of

reducing energy consumptions. Create potential and strategy by estimate the realistic of energy efficiency potential that can be done by internal or external audit; development strategy that will help determine energy demands (Hughes, 2009).

## 1.3 Research Objectives

The main objective of the study is to generate interest among the organization s in the industries in general about the rational usage of energy resources, and to encourage investment in energy savings projects. This also refers to the awareness of the organization in meeting the corporate social responsibility through energy saving programs. Below show the list of objectives of the study:-

1. To determine the energy savings initiatives an organization involve in energy savings program towards corporate social responsibility
2. To determine the factors that encourages the organization to engage and implement energy saving programs.
3. To determine the outcome gained from energy savings program in the organization.

## 1.4 Research Questions

This study if to understand and answer some questions raised to frame the direction.

The three major categories are:-

**1.** What are the energy savings initiatives being adopted by the manufacturing firms in Bayan Lepas and Prai Industrial area in Penang State?

2. What is the relationship between antecedents and adoption of energy savings initiatives among the manufacturing firms in Bayan Lepas and Prai Industrial area in Penang State?
3. What is the relationship between energy savings initiatives adoption and outcomes on Energy Savings among the manufacturing firms in Bayan Lepas and Prai Industrial area in Penang State?

## 1.5 Scope of Study

The scope of this study is targeted manufacturing firms in the industrial sector. The scope of this research is industrial energy savings in manufacturers' internal operations and supply chains. This study addresses why and how manufacturers implement operational and capital improvements to increase the energy savings of their products and operations processes. However, in this study, we do not consider energy efficiency in the transportation of inputs, the distribution of the final goods, residential or commercial buildings, or the supply of energy-savings products by the manufacturers. The study was limited to the Penang state manufacturing industry, not only local but also multinational organization.

## 1.6 Significance of Study

The impact of implementing or achieving energy efficiency has been investigated by a number of foreign researchers. They have generally concluded that cost reduction can be achieved through efficient use of energy. The results of this study show that most of the corporate executives in the industrial sector are unaware of this cost reduction

opportunity through energy efficiency measures as they still treat energy cost as a fixed cost. In summary, energy efficiency will be one of the key elements in enhancing Malaysia industrial sector export competitiveness.

## 1.7 Definitions

Below is the list of the definitions of the main variables used in this research:-

**Legal Factors:** through self-explanatory, legal perspectives will be compliance with public laws and private regulations of the country as well as the role of government and its agencies.

**Financial Factors - Cost Effectiveness:** the lowering of the overall cost of the service to the business that involve reducing the scope, defining quality levels, re-pricing, re-negotiation, and cost re-structuring. Access to lower cost economies through offshoring called “labor arbitrage” generated by the wage gap between industrialized and developing nations (Engardio, Arndt and Foust, 2006).

**Social Factors - Corporate social responsibility**: Based on World Business Council for Sustainable Development (2000), corporate social responsibility is the continuing commitment by business to behave ethically and contribute to economic development while improving the quality of life of the workforce and their families as well as the local community and society at large (Dahlsrud, 2008).

**Environmental Factors:** According to Bedi, Cancee and Falk (2000), most important environmental impacts caused by energy sources are global climate change and acid rain. Cubasch et al (2001), Houghton et al (2001), Frich et al (2002), Easterling et al (2000) added that these is an increasing body of scientific evidence show that climate change is real and urgent.

**Organizational Factors:** Based on the Seven Habits of Highly Efficient Companies, leadership and organizational support is real and sustained in energy savings program (Prindle, 2010),

**Energy Savings:** Through self-explanatory on energy savings, energy savings is defines as the conservative of energy through certain ways, such as energy savings light bulbs used in the household or motor and drives that help to lower the usage of energy in the industries.

# CHAPTER 2

# LITERATURE REVIEW

## 2.0 Introduction

Chapter 2 reviews the published literature on the key terms and ideology that will be used throughout the research. The factors and outcomes between variables shall be discussed here. This chapter consists of topic titled from Determinants of energy savings program in an organization, Energy Savings Initiatives, Outcomes of Energy Savings, Theoretical Framework, Hypothesis Development, and Summary of the Chapter.

## 2.1 Determinants of energy savings program in an organization

Energy savings programs are become increasingly important and popular in the industry. There are few determinants factors or driving force that will influence an organization in adopting energy savings program namely financial factors, environment factors, legal factors, social factors and organization factors that to be discussed further in this section.

### 2.1.1 Financial Factors

Improving energy savings has become one of the most desirable and effective short-term measures to address the issue of energy security, and also to reduce the emission of greenhouse gases (Painuly, 2009). In view on the successes recorded in terms of both energy and financial savings, energy efficiency measures have become an important component of industrial practices in both the developed and strongly emerging

economies across the globe. At current, environmental pressures have added to make energy efficiency practice an indispensable tool in the fight against green house gases emissions to our environment (Unachukwu, Zarma & Sambo, 2011). On the other hand, the primary goal of every business venture or enterprise is to make profit. Industries are established to make profit after discounting expenditure on raw materials, labor and interest on capital, energy bills are generally regarded as overheads to be paid without rigorous scrutiny. Therefore, energy costs constitute a sizeable proportion of industry overhead costs, and yet it is a significant proportion of controllable costs and further carries a high risk of being partly unnecessary (Unachukwu, Zarma & Sambo, 2011).

Energy savings reduces costs and releases funds for other purposes. In other words, successful, cost effective investment into energy efficiency technologies and measures meets the challenges of maintaining the output of a high quality product while reducing production costs. Therefore, energy efficiency is an important component of a company's environmental strategy, as energy efficiency measures tied to the overall company policy can be an inexpensive opportunity to reduce criteria and other pollutant emissions. Improving energy efficiency is the most effective method of achieving set targets in greenhouse gas emissions, and also be an efficient and effective strategy to work towards the so called "triple bottom line" that focuses on the social, economic and environmental aspects of a business (Ernst & Galitsky, 2005). Among all the energy forms, electricity is the most widely deployed in the industry for the transformation of raw materials into the desired end products. Electricity consumptions in the industry is usually for lighting, motor power-drives of various kind of equipment. However, improvement in the efficiency of electric motors in particular can result into large energy

and cost savings (Unachukwu, Zarma & Sambo, 2011). Painuly (2009) added that there is a potential for energy savings, though there are vary in the estimates of the quantity of possible cost savings, there are studies indicate a large potential on cost savings through energy savings program.

Based on the study, the potential of energy savings program ranges from 10 to 30 percent over the next two to three decades in the industrialized countries, and 50 to 90 percent in the case of new installations in developing countries and 20 to 50 percent in existing installations (Goldemberg et al., 1994). However, despite financial benefits is one of the attractive elements encourage the company to implement energy savings programs, financing is one of the major barriers to energy savings, as financing is a major problem for stand-alone energy savings projects especially for the small and medium enterprises (Painuly, 2009). Therefore, banking and other financial community in most countries are now much more aware about energy savings, and they are open to financing energy savings project provided they meet their eligibility criteria (Painuly, 2009).

Castro-Lacouture and Roper (2008) added that finding a viable method of finance is a major challenge for any energy savings programs. For instance, budgeting is a key phase of the decision process that must be addressed in an efficient manner for any energy savings program to move forward. They added that there are multiple methods of financing available in an effort to meet an organization's energy savings' goal (Castro-Lacouture & Roper, 2008). These methods include the incentives offered by the Department of Energy (DOE) to implement energy savings program; tax exemptions and loan guarantees for similar financing for energy savings installations; energy contracts

with qualified suppliers and utility providers who work on the energy savings programs (Bird et al., 2004).

On the other hand, there are research stated that throughout the world, energy savings is ranked as a high priority on the environmental agenda, this is due to its large share of overall energy consumption (30-40 per cent) and the potential for economic improvements are from the constructions that presents a major energy savings opportunities (Georgopoulou et al., 2006; McGregor, 1994; Hanemann and Farrell, 2006; UNEP, 2007). However, there is dilemma of energy savings in construction which is the minor financial significance energy represents in most of the end-users organizations, in which in office building, most of the energy costs are often dwarfed by the initial investment cost or the rent of the premises (Davies & Chan, 2001). Junnila (2004); Kats et al. (2003); Leibowitz (2001) stated that the contrast is even more extreme when the energy costs are compared with labour and other operating costs of the end-user organization as the energy costs are typically less than one per cent of the running costs of an office organization.

Sorrell et al (2004) added that barrier to energy savings program is defined here as "a postulated mechanism that inhibits a decision or behavior that appears to be both energy efficient and economically efficient." There are considerable legal, financial and social potential for improving industrial energy efficiency and the economics appear favorable, even without putting a price on carbon emissions. There are arguments stated that such improvements frequently involve the adoption of established technologies and programs whose performance is well proven and which involve relatively little risk. However, it has been recognized that numerous barriers to energy savings program

inhibit the adoption of such technologies, such as lack of information, shortage of trained personnel and limited access to capital. In particular, the adoption of energy savings programs technologies may be associated with various "hidden cost" that are difficult to rectify within energy-economic models. On the other hand, there are general consensuses that en energy savings "gap" exists, and the policy options to overcome this gap need to be identified and acted upon, there is considerable debate over the most effective approach (Sorrell, Mallett, Nye, 2011).

### 2.1.2 Environmental Factors

There is an increasing study of scientific evidence that climate change becoming crucial and real (Cubasch et al, 2001; Houghton et al, 2001; Frich et al., 2002; Easterling et al., 2000). Efforts to fight adverse climate change as a result of greenhouse gas emissions, especially from the manufacturing, construction and transport sectors are now developing, following by the ratification of the Kyoto Protocol in 1997 ( Climate Change Secretariat, 2002; Dunn, 2002). There are initiatives with the vision set binding targets for reducing greenhouse gas emissions, develop energy savings sources, promote energy savings and use bio-fuels (Olesen and Kvetny, 2006; New Scientist, 2007).

On the other hand, Govindarajulu and F. Daily (2004) added that in twenty-first century businesses are taking a more strategic approach to environment management towards energy savings program. Though majority of the companies have used the compliance approach in their environmental programs driven by the laws and regulations, in the past few years, environmental forces such as consumer boycotts, dynamic preferences, and new customer requirements have affected the basic business strategies

(Bhushan & MacKenzie, 1994; Quazi, 2001). Besides, organizations started to seek environmental benchmarking to compare performance both across industries and among their own facilities which is important to moving businesses closer to effective practices (Matthews, 2008). Thus, the company will implement environmental management system (EMS) for organizing internal corporate environmental benchmarking. An EMS system captures the environmental burdens of an entire facility in an organization and encourage continuous improvement of environmental performance in that organization (Matthew, 2008).

Company began to implement EMS to capture various activities with environmental impacts, as organizations recognized that compliance with regulatory requirements was not adequate for competitiveness and efforts turned to pollution prevention and monitoring of operations for proper execution (Hoffman, 1994; Yosie & Herbst, 1996). The most well-known and accepted EMS is the ISO 14000 series of standards on environment management established by the International Organization of Standard (ISO, 1996). ISO defines EMS as "part of the overall management system which includes organizational structure, planning, activities, responsibilities, practices, procedures, processes and resource developing, implementing, achieving, reviewing, and maintaining the organization's environmental policy." (ISO, 1996)

Besides, energy savings programs can also help to enhance public reputation, organizations that save the energy can differentiate themselves as "environmental-friendly" organizations and will gain good reputations from the public. Many benefits, such as attracting and maintaining good employees, faculty, students, customers, and suppliers, resulted from being a "good" leader in the industry. There is a recent study

showed that 92% of young professionals want to work for an organization that is environmental-friendly (Woodproof, Turner, Heinz, 2008). Improving energy efficiency is one of the most effective ways of improving environmental performance. For example, energy efficiency programs in the industrial sector in certain country will provide a source of reducing greenhouse gas emissions under a clean development mechanism scheme as laid out in article 12 of the Kyoto protocol (Unachukwu, Zarma and Sambo, 2011). On the other hand, organizations compare their performance both across industries and among their industries through environmental benchmarking which is the environmental management system (EMS) (Matthews, 2003).

ISO 14000 is a series of standards or the International Standard for Environment that was released in September 1996 which is developed to provide a common ground rules for evaluating and benchmarking an organization's EMS (Hale, 1997; Erickson and King, 1999; Lutz, 2000). There are five key elements in which the ISO 14000 standard involves, which include the environmental policy, planning, implementation and operation, checking and corrective action, and management review (Krut and Gleckman, 1998; Erickson and King, 1999; Nattrass and Altmore, 1999). There are study show that with the adoption of ISO 14001 standards will provide both tangible and intangible benefits to the companies, such as cost savings; improved communication; reduction in fines; improved corporate image and improved in operational processes (West and Manta, 1996; Maxwell et al,. 1997; Chandrashekar et al., 1999; Nattrass and Altmore, 1999; Zingale and Himes, 1999; Darnall et al., 2000; Hanna et al., 2000; Lee-Mortimer, 2000; Schaarsmith, 2000; Daily and Huang, 2001). This is support by ISO (1998) states that organizations can obtain some benefits from implementation of the ISO EMS which

include the reduced cost of waste management, savings in consumption of energy and materials, lower distribution costs, and an improved corporate image among the stakeholders who include the regulators, customers and the public (Matthews, 2008).

### 2.1.3 Legal Factors

There has been an increasing awareness on the environmental issues in the recent years and there is a substantial number of environmental laws and regulations have been enacted to hold the companies accountable for their environmental responsibilities (Agbejule, Fernandez & d'Espiney, 2004). There are survey undertaken to investigate the level of awareness on energy legislation, policies and measures on the develop of renewable energy sources, promote energy savings and use bio-fuels (Olesen,& Kvetny, 2006; New Scientist, 2007). The survey also examined the role of design professionals in implementing energy legislation and the incentives and barriers to the implementation of energy savings regulatory and legislative requirements (Adeyeye, Osmani & Brown, 2007).

All companies must work within the legal frameworks of the societies in which they conduct the businesses, if not they will be in risk on their license to conduct trade. Thus, compliant to laws and regulations, responses to environmental incidents are the legal factors to encourage a company implement energy saving programs. A key factor for companies to monitor their impact on the environment is to ensure compliance with environmental regulations for air, water and waste emissions (Brun, Gereffi, 2011).The Environmental Quality Act 1974 increased the salience of air regulations for the companies in Malaysia. The declaration and monitoring pollution control system by the Department of Environment (DOE) of Malaysia have influenced some companies to

become more aware of, and plan for, the legal implications of their carbon emissions (Handbook: Economic Instruments for Environmental Management Malaysia).

Government could play a bigger role in the low-carbon economy by promoting good practices, raising awareness and enhancing consumer demand for low-carbon goods and services. Legislation will create a level playing field, helping foster a market for energy-efficient systems necessary for the development of a smarter electrical grid, lowering the cost associated with energy conservation. On the other hand, tax incentives are another way to encourage the corporate sector towards efficiency. These are attractive particularly for emerging-economy governments, since they cost less than subsidies (Ingersoll Rand, 2011). Furthermore, in the case of government, political as well as market pressure can be brought to bear on the use of "appropriate" technologies in the public's interest, a situation where "utility" can be more than economic (Biggart, Lutzenhizer, 2005).

The world is going through a crisis and energy is at the center of it all, thus, efforts are being made by nations and from every single angle towards achieving eco-friendly balance in energy production and consumption. An exercise to determine where and how energy is being used in a facility through audit is one of the identified measures to realize energy, cost and environmental savings within the eco-energy cycle. Energy efficiency programs therefore provide insight into inefficient operations and practices and these able to signify in terms of energy, cost and environmental savings. Energy savings opportunities in the industrial sub-sector of the economy have remained a matter of speculation over the years due to uncoordinated efforts at addressing issues relating to energy efficiency and management. Thus, it is in the bid to create necessary awareness on

the huge potentials of energy savings in the sector by the governments and other stakeholders of the company in the country (Unachukwu, Zarma and Sambo, 2011).

However, Todd (2009) argued that the environmental legislation resulted in the development of industry regulations are difficult to comply with and are also very costly as well. There are findings shows that in year 2000, there is an excess of $450 billion cost businesses compliance with the environmental rules in the United States (McDowall, 2001). Furthermore, the electric utilities in the United States from year 2000 – 2005 spent more than $24 billion to be in compliance with the federal environmental laws, which still do not include compliance to the state and local laws (Edison Electric Institute, 2006). Todd (2009) added that though adherence with many of these regulations has resulted in a reduction of emission and environmental accidents, however, there is no worldwide agreement on which environmental management system to use.

There are study shows that the enforcement of the Law on Energy Saving and Improving Energy Efficiency in the Russian Federal encourage the use of energy saving technologies and improving energy efficiency. However, the efforts to improve energy efficiency in Russia through the establishment of a legislative basis proved to be inefficient when it first started in mid-1990s, and the energy efficient issue was then being removed from the top-priority list after the 1998 crisis. Begins in 2008, a new stage of the government's policy relating to energy efficiency being introduced again with the requirement that by year 2020, there will achieve a 40% reduction in energy efficiency of the Russian Federation's GDP as compared to 2007 (Economic Commission For Europe). In short, this shows that though it is costly to compliance to the legislation in improving energy efficiency, legislative requirement is still one of the determinants of energy

savings program to an organization that will help to enforce the energy savings program in the organization.

Energy efficiency has become a household word globally in general defined as "all changes that result in decreasing the amount of energy used to produce one unit of domestic activity…or to meet the energy requirements for a given level of comfort" (World Energy Council, WEC 2004). Many corporations in the industrialized countries were forced to review their existing energy policies and incorporate energy conservation and end-use efficiency improvements as an important component of their energy policy. The increasing role of active energy efficiency promotion in achieving environmental sustainability and economic development has long been recognized by many nations such as an Energy Conservation Promotion act was enacted in Thailand in 1992 (Unachukwu, Zarma and Sambo, 2011).

On the other hand, Alcock (2008) added that carbon reduction in a company has become an imperative for forward-thinking organization to follow a number of major changes in government legislation. However, lacking of industry energy policy in and organization will be the obstacle for the organization in adopting energy savings programs. Industry energy policy is a programme promotes benchmarking that creates the necessary foundation for improvements as it provides technical advice and guidance for energy management in an organization (Brun & Gereffi, 2003).

### 2.1.4 Social Factors

The need to establish a better understanding of Corporate Social Responsibility (CSR) and to develop a more robust definition is crucial in this research report. There are few

methodological approaches in defining corporate social responsibility with Carroll's (1999) CSR definitions in academic literature, follows by Moir (2001) expanding the analysis include definition used by business. Thus, there are many available definitions of CSR and the definitions are predominantly congruent, making the lack of one universally accepted definition less problematic than it might seem at first glance. From the study, CSR definitions are describing phenomenon, but fail to present any guidance on how to manage the challenges within this phenomenon. Hence, the challenge for business is not to define CSR, but to understand how CSR is socially constructed in a specific context and how to take this into account when business strategies are developed (Dahlsrud, 2008).

There is no single, commonly accepted definition of CSR as there are different perceptions of the concept among the private sector, governments and civil society organizations. Depending on the perspective, CSR may cover a company running its business responsibly in relation to internal stakeholders; the role of business in relationship to the state, locally and nationally, and also to the standards; business performance as a responsible member of the society in which it operates and as the global community (Mazurkiewicz, 2011). Hence, with the introduction of CSR in a corporation will help the corporation to implement the energy savings program more efficiently.

Sustainability and corporate social responsibility initiatives becoming more important to the corporations, hence, climate and energy efficiency issues are growing concerns for the corporations. Furthermore, energy efficiency should be seen as the company's corporate social responsibility efforts. The environmental aspect of corporate social responsibility is defined as the duty to cover the environmental implications of the

company's operations, products and facilities; eliminate waste and emissions; maximize the efficiency and productivity of its resources; and minimizes practices that might adversely affect the enjoyment of the country's resources by future generations (Mazurkiewicz, 2004).

Energy savings programs are important towards global warming that is happening to our earth and has seriously destroying our earth due to the gas emissions from human activities. Besides, energy savings programs are important in saving our earth, as well as saving the cost of an organization, as the energy saved will automatically saved the cost of operation. Major source of emission of greenhouse gases are due to burning of fossil fuels, from power, cement, steel, textile, fertilizer, and many other industries which rely on fossil fuels. The emission of greenhouse gases such as carbon dioxide, methane, nitrous oxide, etc., which will increase the atmosphere's ability to trap infrared energy and affect on the climate. Therefore, the introduction on the concept of carbon credits as a result of increasing awareness of the need for controlling emissions. The IPCC (Intergovernmental Panel on climate change) has observed that "the policies that provide a real or implicit price of carbon could create incentives for producers and consumers to significantly invest in low-GHG products, technologies and processes. These policies could include economic instruments, government funding and regulations" (IPCC, 2007). The goal of carbon credits is to allow market mechanisms to drive industrial and commercial processes in the direction of less carbon intensive approaches. Since the emissions of GHGs generate credits, this approach can be used to finance carbon reduction scheme between trading partners and around the nation. This encourage more organizations engage in energy savings program as they can sell carbon credits to

commercial and individual customers who are interested in lowering their carbon footprint on a voluntary basis (UNFCC Press Briefing, 2007).

Roaf et al (2004) added that however, construction is a major contributor to carbon dioxide emissions in the modern society and therefore, the potential role of the built environment in reducing energy use contributing positively to the climate change other then the energy savings program implement by the industrial sector. Runci (1999) added that buildings have substantial energy requirements in which approximately 40 percent of overall energy consumption is associated with the building construction, use and deconstruction. From social dimension, due to pressure from local communities-with the increased demand from "green-minded" consumers with the creation in today's "green-minded' economy, many organizations have used "green" programs as a marketing tool to differentiate themselves from the competitors, achieve the organizations' vision and mission, secure and retain talents, improve productivity and improve greater market share. These reductions/benefits can be published in various places to improve the organization's green image with employees, clients, students, suppliers, distributors, shareholders and other groups relevant to the success of an organization. Thus, due to energy savings program, the school can claim environmental benefits equivalent to removing 1,008 cars off the road, thereby improving the school's public image. Although not calculated here, the benefits of attracting better faculty, students, employees, and others, could far outweigh all the benefits of energy savings (Woodproof, Turner & Heinz, 2008, pp.5 & 6).

By reducing the use of energy and raw materials and limit emissions and waste from production processes are key contributions that organization can make to tackle the

environmental challenges facing the world. Many corporations are adopting environmental policies that extend through their supply chains in the form of requirements for suppliers to adhere to sustainability certifications such as ISO 14001, SA 8000 or FSC (Mazurkiewicz, 2004).Besides, lacking of access to energy use information in industries is one of the barriers towards meeting energy efficiency. For any meaningful program in relation to energy efficiency measures a baseline data generated through measurement is essential. Industries in certain country are highly apprehensive of any effort to collect data on energy use from their factories. This is due to fear of possible tax imposition by the government. Thus, one of the ways to get around this problem is to increase the level of public awareness on the economic and social benefits of energy efficiency measures. In addition, the passage of the freedom of information bill that will allow unfettered access to information including energy use information from the industries will be a welcome development (Unachukwu, Zarma and Sambo, 2011).

### 2.1.5 Organizational Factors

Companies will focus their energy savings program in the organization's internal operations that have put in place to reduce the energy use in the manufacturing processes, buildings and other facilities. There are studies show that there are no single ideal organization chart for the best practice of energy savings program, however, there are best programs that fit to the company's structure and culture (Prindle, 2010). There is a theoretical framework presented by a research paper on the environmental performance by looking at the crucial employer and employee factors affecting the environmental

performance towards energy savings program. This framework mainly focuses on the integration between top management commitment, employee empowerment, rewards, feedback and review, and environmental performance as the key elements in encouraging employees for enhanced energy savings program in the company (Govindarajulu & F. Daily, 2004).

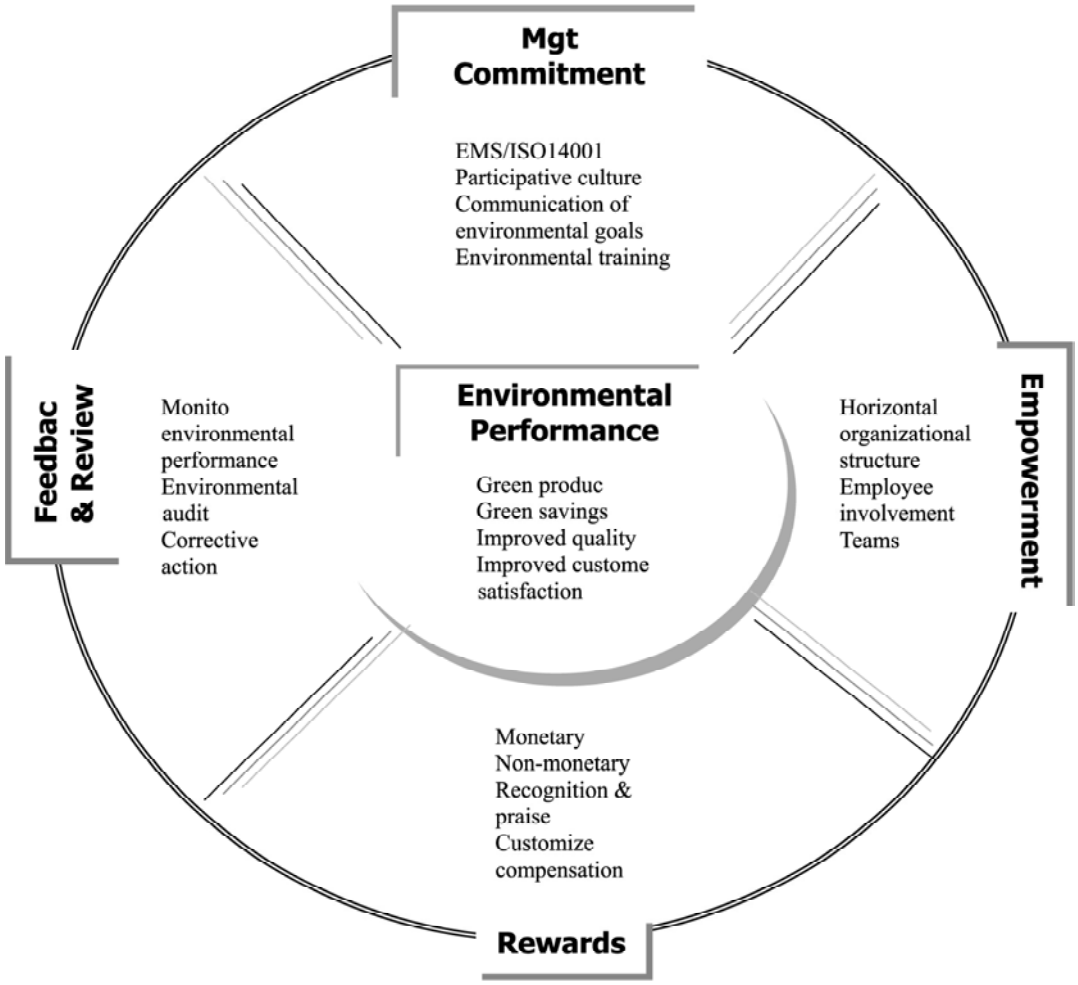


*Figure 2.0 Motivating factors for environmental performance in an organization (depicted from Govindarajulu & F. Daily, 2004).*